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Amani

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(54) **SYSTEM FOR PROVIDING AN ALTERNATIVE CONTROL INTERFACE TO SPECIALTY PRINTING DEVICES**

(71) Applicant: **Majid Amani**, East Greenwich, RI (US)

(72) Inventor: **Majid Amani**, East Greenwich, RI (US)

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(51) **Int. Cl.**

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G06K 1/00	(2006.01)
H04N 1/00	(2006.01)
G06F 3/12	(2006.01)

(52) **U.S. Cl.**
CPC ***G06F 3/1279*** (2013.01); ***G06F 3/1228*** (2013.01); ***G06F 3/1243*** (2013.01); ***G06F 3/1276*** (2013.01); ***G06F 3/1284*** (2013.01)

(58) **Field of Classification Search**
CPC ... G06F 3/1279; G06F 3/1228; G06F 3/1243; G06F 3/1276; G06F 3/1284
USPC 358/1.1, 1.15, 1.14, 1.6
See application file for complete search history.

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2007/0097161	A1 *	5/2007	Ejiri et al.	347/5

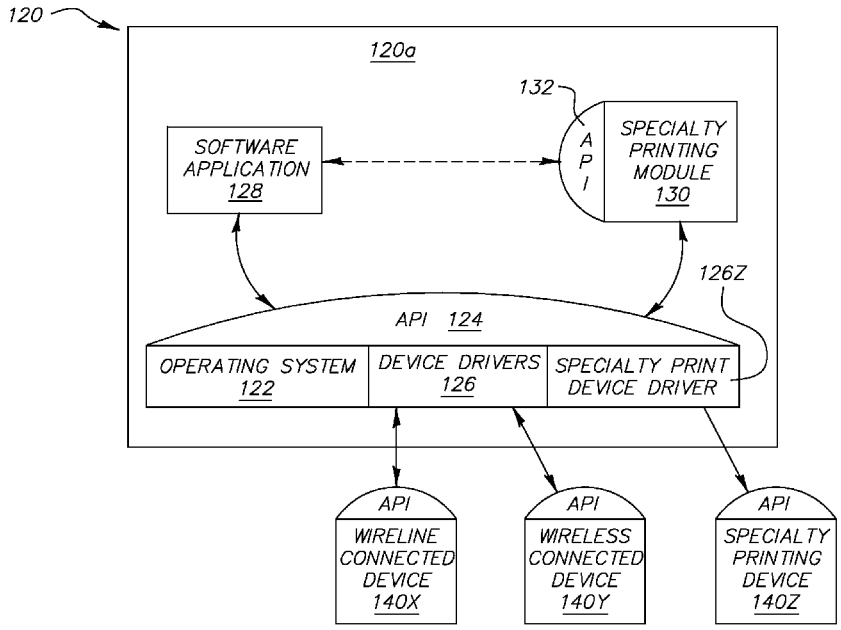
* cited by examiner

Primary Examiner — Douglas Tran
(74) *Attorney, Agent, or Firm* — Kenneth J. Lukacher Law Group; R. S. Rosenholm

(57) **ABSTRACT**

The invention provides an alternative applications programming interface (API) for a software application to interface with and to control the operation of a variety of one or more specialty printing devices. The alternative API provides a superset of control functionality relative to an API that would typically be provided by a specialty printing device driver. In some embodiments, this alternative API is provided via a specialty printing module (SPM) that is remotely accessible to a software application via a computer network. The SPM can provide for interface and control of specialty printing devices that would otherwise be un-accessible to a software application via a specialty printing device driver, and can provide such locally or remotely accessible functionality to the software application, without necessarily requiring employment of a specialty printing device driver.

23 Claims, 7 Drawing Sheets



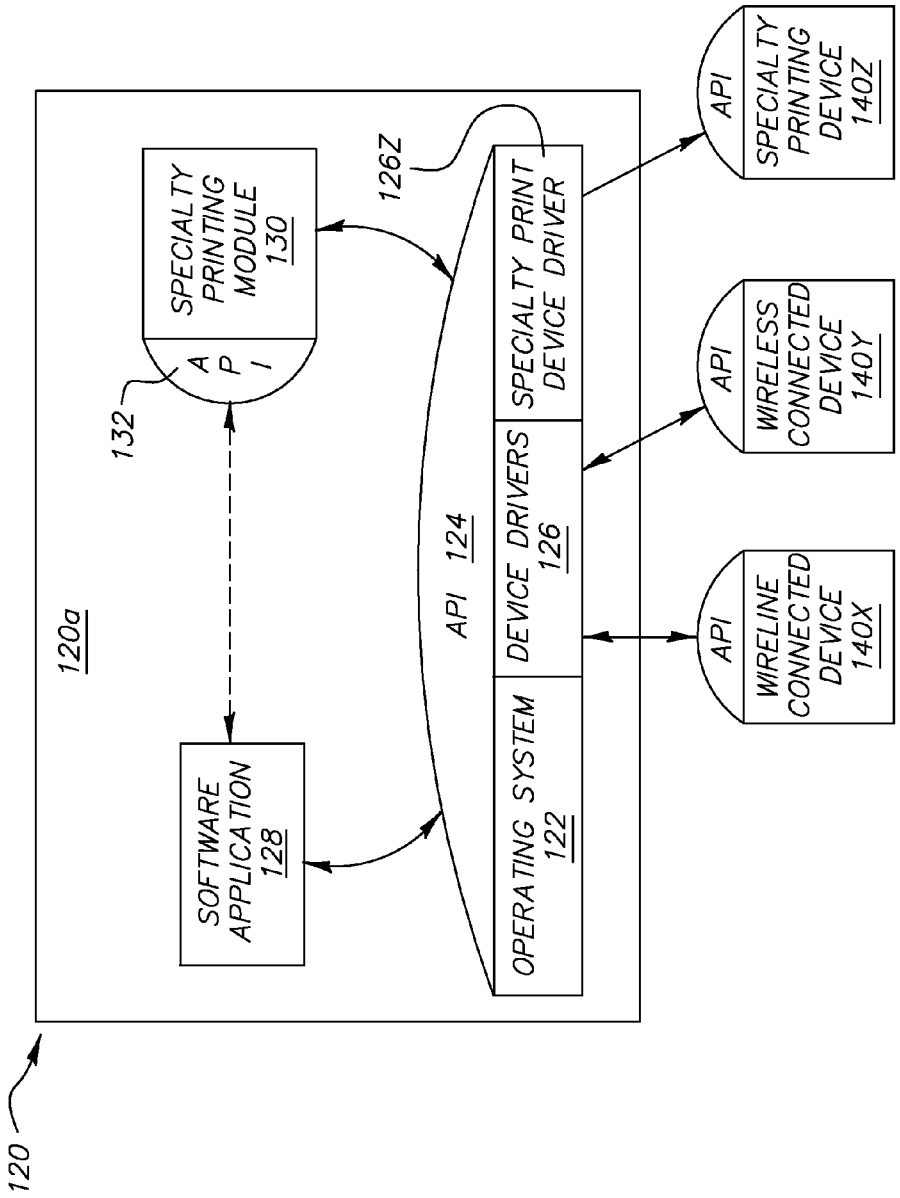

120
120a
SOFTWARE APPLICATION 128
SPECIALTY PRINTING MODULE 130
API
132
API 124
OPERATING SYSTEM 122
DEVICE DRIVERS 126
SPECIALTY PRINT DEVICE DRIVER
126Z
API
WIRELINE CONNECTED DEVICE 140X
API
WIRELESS CONNECTED DEVICE 140Y
API
SPECIALTY PRINTING DEVICE 140Z

FIG. 1

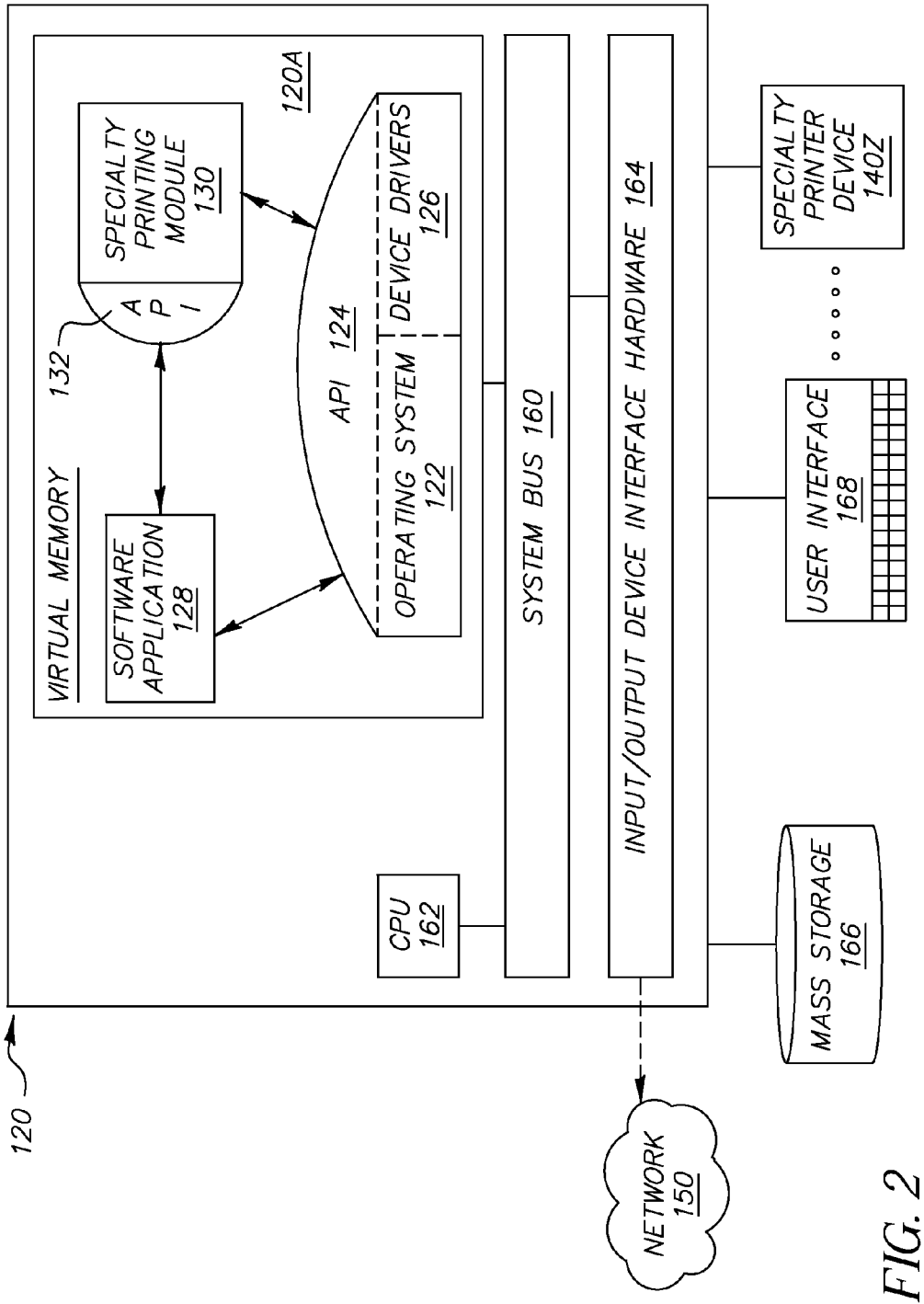

120
VIRTUAL MEMORY
120A
SPECIALTY PRINTING MODULE 130
API
132
SOFTWARE APPLICATION 128
API 124
OPERATING SYSTEM 122
DEVICE DRIVERS 126
SYSTEM BUS 160
INPUT/OUTPUT DEVICE INTERFACE HARDWARE 164
CPU 162
MASS STORAGE 166
USER INTERFACE 168
SPECIALTY PRINTER DEVICE 140Z
NETWORK 150

FIG. 2

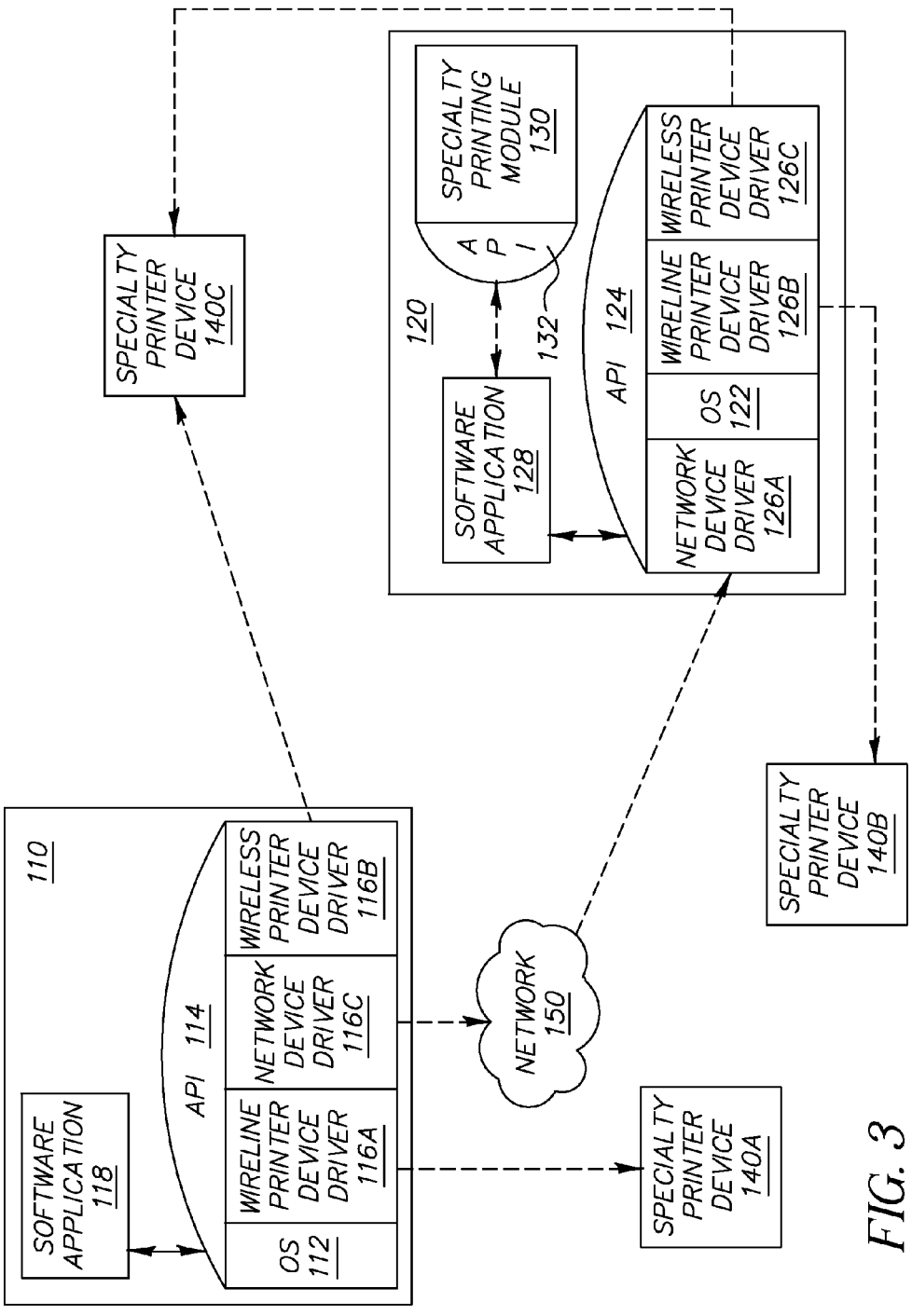

110
SOFTWARE APPLICATION 118
API 114
OS 112
WIRELINE PRINTER DEVICE DRIVER 116A
NETWORK DEVICE DRIVER 116C
WIRELESS PRINTER DEVICE DRIVER 116B
NETWORK 150
SPECIALTY PRINTER DEVICE 140A
SPECIALTY PRINTER DEVICE 140B
SPECIALTY PRINTER DEVICE 140C
120
SOFTWARE APPLICATION 128
API 124
OS 122
NETWORK DEVICE DRIVER 126A
WIRELINE PRINTER DEVICE DRIVER 126B
WIRELESS PRINTER DEVICE DRIVER 126C
SPECIALTY PRINTING MODULE 130
API
132

FIG. 3

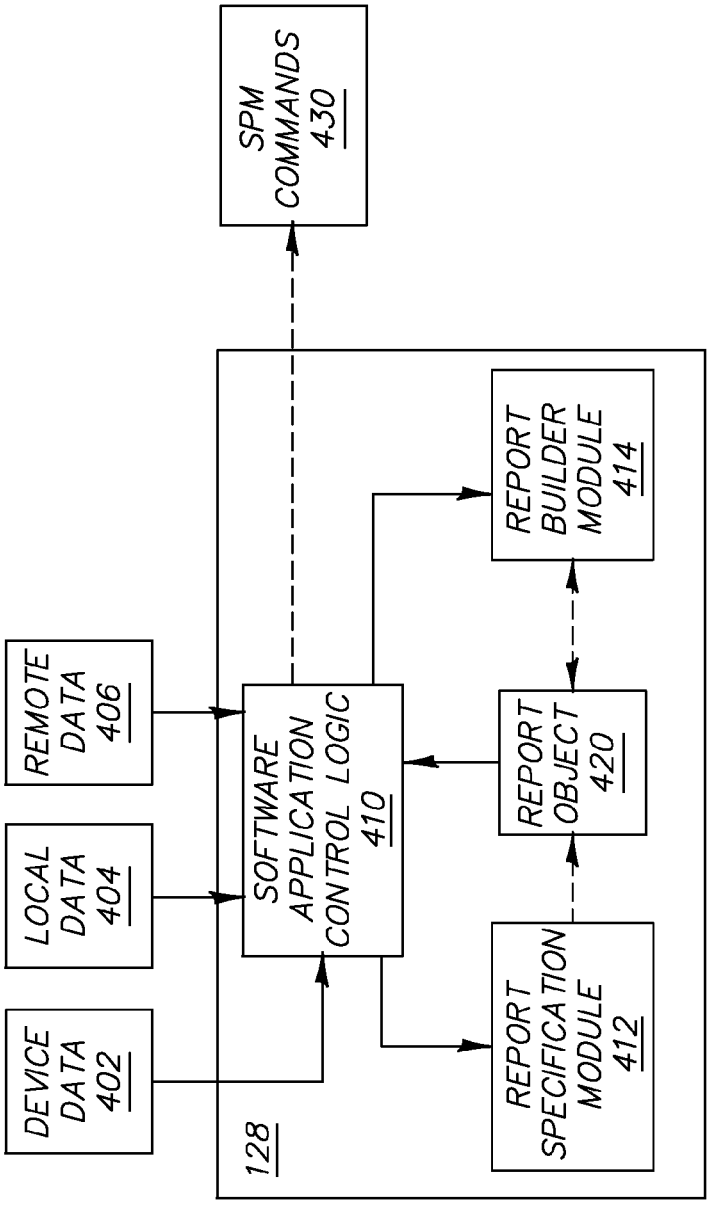

SPM COMMANDS 430
REPORT BUILDER MODULE 414
REMOTE DATA 406
LOCAL DATA 404
DEVICE DATA 402
SOFTWARE APPLICATION CONTROL LOGIC 410
REPORT OBJECT 420
REPORT SPECIFICATION MODULE 412
128

FIG. 4

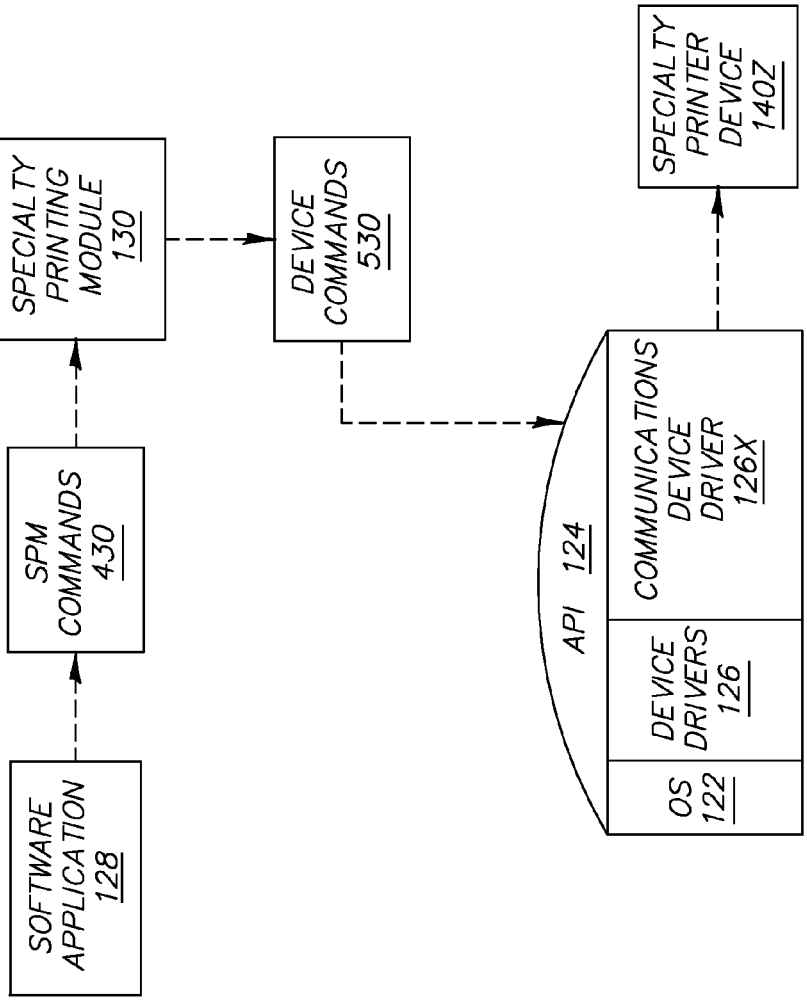

SOFTWARE APPLICATION 128
SPM COMMANDS 430
SPECIALTY PRINTING MODULE 130
DEVICE COMMANDS 530
OS 122
DEVICE DRIVERS 126
API 124
COMMUNICATIONS DEVICE DRIVER 126X
SPECIALTY PRINTER DEVICE 140Z

FIG. 5

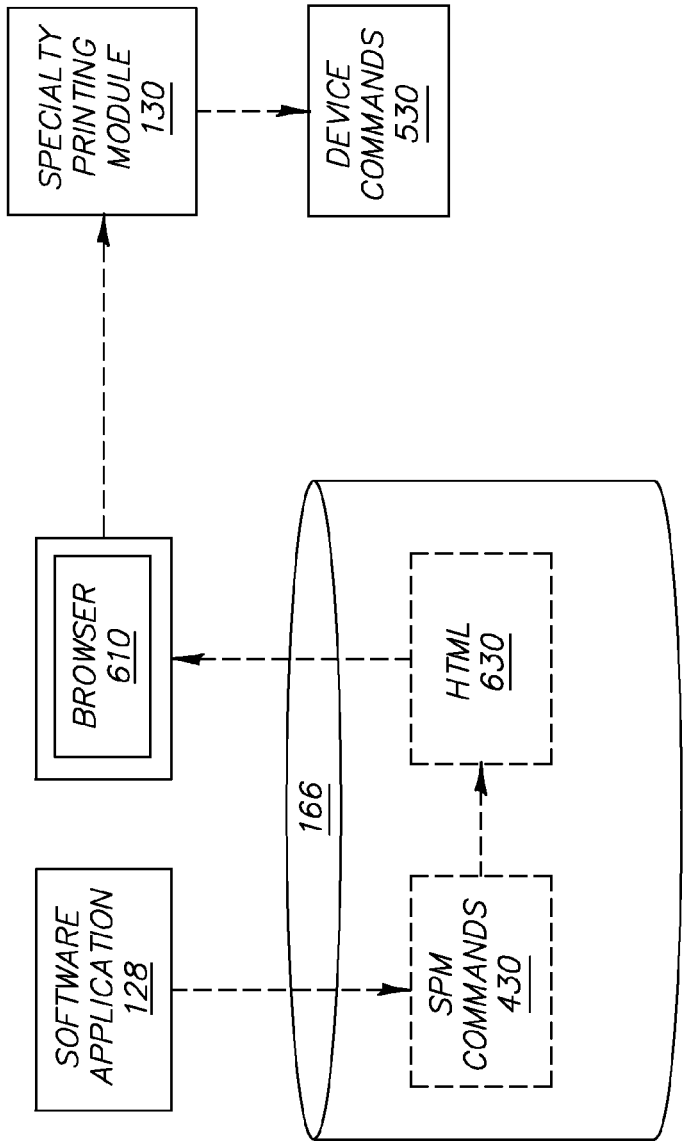
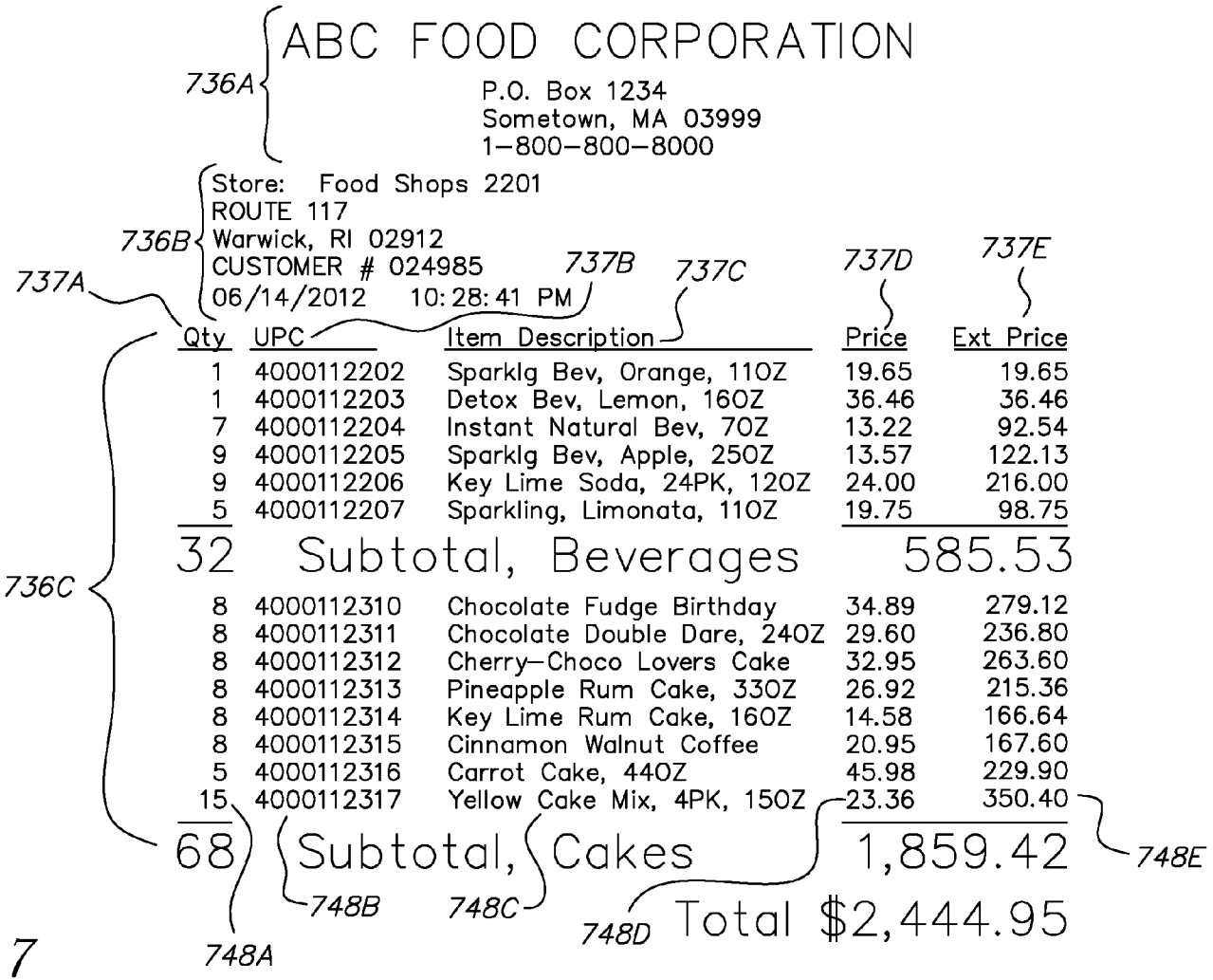

SPECIALTY PRINTING MODULE 130
DEVICE COMMANDS 530
BROWSER 610
HTML 630
166
SOFTWARE APPLICATION 128
SPM COMMANDS 430

FIG. 6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7 4000112204 Instant Natural Bev, 7OZ 13.22 92.54
9 4000112205 Sparklg Bev, Apple, 25OZ 13.57 122.13
9 4000112206 Key Lime Soda, 24PK, 12OZ 24.00 216.00
5 4000112207 Sparkling, Limonata, 11OZ 19.75 98.75
32 Subtotal, Beverages 585.53
8 4000112310 Chocolate Fudge Birthday 34.89 279.12
8 4000112311 Chocolate Double Dare, 24OZ 29.60 236.80
8 4000112312 Cherry-Choco Lovers Cake 32.95 263.60
8 4000112313 Pineapple Rum Cake, 33OZ 26.92 215.36
8 4000112314 Key Lime Rum Cake, 16OZ 14.58 166.64
8 4000112315 Cinnamon Walnut Coffee 20.95 167.60
5 4000112316 Carrot Cake, 44OZ 45.98 229.90
15 4000112317 Yellow Cake Mix, 4PK, 15OZ 23.36 350.40
68 Subtotal, Cakes 1,859.42
748A
748B
748C
748D
748E
Total $2,444.95

FIG. 7

SYSTEM FOR PROVIDING AN ALTERNATIVE CONTROL INTERFACE TO SPECIALTY PRINTING DEVICES

This document is a United States non-provisional utility patent application that claims priority and benefit to U.S. (utility) provisional patent application having Ser. No. (61/869,615) (Confirmation No. 9588), that was filed on Aug. 23, 2013 and that is entitled "SYSTEM FOR PROVIDING AN ALTERNATIVE CONTROL INTERFACE TO SPECIALTY PRINTER DEVICES", and which is incorporated herein by reference in its entirety.

BACKGROUND OF THE INVENTION

Specialty printers are specially designed devices that transfer information onto various types of portable media. These types of devices are typically configured to be peripheral to a computer system and perform functionality that is typically not directly available to most computer systems. Hence these devices are characterized as being special, as they are atypical relative to standard printers sold in high volume within the desktop computer market.

The discussion above is merely provided for general background information and is not intended to be used as an aid in determining the scope of the claimed subject matter.

BRIEF DESCRIPTION OF THE INVENTION

The invention provides an alternative applications programming interface (API) for a software application to interface with and control the operation of a variety of one or more specialty printers, which are also referred to herein as specialty printing devices. The alternative API provides a superset of control functionality relative to an API that is typically provided by a specialty printing device driver. In some embodiments, the alternative API is provided via a specialty printing module (SPM) that is remotely accessible to a software application via a computer network. The SPM can provide for interface and control of specialty printing devices that would otherwise be un-accessible to a software application via a specialty printing device driver, and can provide such locally or remotely accessible functionality to the software application without necessarily requiring employment of a specialty printing device driver.

This brief description of the invention is intended only to provide a brief overview of subject matter disclosed herein according to one or more illustrative embodiments, and does not serve as a guide to interpreting the claims or to define or limit the scope of the invention, which is defined only by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

So that the manner in which the features of the invention can be understood, a detailed description of the invention may be had by reference to certain embodiments, some of which are illustrated in the accompanying drawings. It is to be noted, however, that the drawings illustrate only certain embodiments of this invention and are therefore not to be considered limiting of its scope, for the scope of the invention can encompass other equally effective embodiments. The drawings are not necessarily to scale. The emphasis of the drawings is generally being placed upon illustrating the features of certain embodiments of the invention. In the drawings, like numerals are used to indicate like parts throughout the various views. Differences between like parts may cause those parts

to be indicated with different numerals. Unlike parts are indicated with different numerals. Thus, for further understanding of the invention, reference can be made to the following detailed description, read in connection with the drawings in which:

FIG. **1** illustrates communication between a specialty printing module and other software executing within a virtual address space of a computer system.

FIG. **2** illustrates a simplified representation of hardware and software residing within a host computer system.

FIG. **3** illustrates communication between a plurality of host computer systems and a variety of output devices (specialty printers).

FIG. **4** illustrates a simplified representation of the internals of an embodiment of the software application of FIG. **3**.

FIG. **5** illustrates a simplified representation of communication between the software application, specialty printing module, operating system and the specialty device.

FIG. **6** illustrates a simplified representation of communication between the software application, an HTML browser and the specialty printing module.

FIG. **7** illustrates a report that is rendered (printed) onto media of a specialty printer.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** illustrates communication between a specialty printing module **130** and other software executing within a virtual address space **120***a* of a computer system **120**. As shown, a software application **128** communicates with a specialty printing module **130** via an applications programming interface (API) **132** of the specialty printing module **130**.

The software application **128** communicates with the SPM **130** via a first communications channel provided by the operating system (OS) **122**. For example, in some embodiments, this first communications channel is a socket communication mechanism provided by the operating system **122** to the software application **128** and to the specialty printing module (SPM) **130**. To exercise this socket mechanism, the software application **128** and the SPM **130** each communicate with the operating system **122** via exercise of an applications programming interface (API) **124** provided by the operating system **122** itself.

In other embodiments this communications channel is implemented via OpenURL( ) method call which is available within the applications programming interface (API) of a Java programming environment. A uniform resource locator (URL) is applied as an address of the SPM **130**. A URL is a type of uniform resource identifier (URI). Another type of URI is a uniform resource name (URN).

In this circumstance, the URL address of the SPM **130** is employed by the software application **128** to access and to exercise the programming interface of the SPM **130**. In other words, the SPM **130** programming interface is exercised by another software component, such as the software application, through the URL address. Also, in these circumstances, the software application **128** and the SPM **130** can reside upon the same computer and are local to each other, or can each reside on different computers. These different computers can be located proximate to or remote from each other. In other embodiments, a uniform resource name (URN) can be employed and mapped to a URL. Similar URL address based mechanisms can be employed to provide a communication for specialty printer discovery (See FIG. **6**)

The operating system **102** communicates with various devices **140***x*-**140***z* via a set of device drivers **126**, including device driver **126***z*, which function as an extendable and con-

figurable portion of the operating system **122**. The operating system **122** interfaces with a wireline connected device **140***x* via a wireline connected device driver included within the set of device drivers **126**. The operating system **122** interfaces with a wireless connected device **140***y* via a wireless connected device driver that is included within the set of device drivers **126**. The operating system **122** interfaces with a specialty printer device **140***z* via the specialty printer driver **126***z*, that is also included within the set of device drivers **126**.

In terms of functionality, the device drivers **126** each have an applications programming interface (API) that typically provides functional control of a device that is specific to a design of that particular device **140***x*-**140***z*. This type of functional control is enabled via a set of commands that reflect a specific design of a device **140***x*-**140***z* and that are processed when received by the device **140***x*-**140***z*. These commands also referred to as providing a lower level (physical) access to and control of each of the devices **140***x*-**140***z*.

Via the operating system **122** and its device drivers **126**, the software application **128** can also communicate with each of the devices **140***x*-**140***z*. However, such communication is limited to the limitations within each of the set of device drivers **126**, including the device driver **126***z*. Typically, a device driver API provides access to specific functions of the device. As a result, the software application **128** is also limited to communicating (invocation of) specific functional commands of each of the devices **140***a*-**140***z* via the operating system **122** and its device drivers **126**.

Conversely, the specialty printing module **130** provides an alternative and different applications programming interface (API) **132** relative to that provided by the API **124** of the operating system **122** via its device drivers **126**. Like that provided by the operating system **122**, the specialty printing module (SPM) API **132** provides access to specific functions of a device **140***x*-**140***z* and further provides a superset of the functional control that is provided by the operating system **122** via its drivers **126**. This superset includes higher level functions for which the software application **128** can invoke (communicate) to the device **140***z* via the specialty printing module (SPM) API **132**.

For example, the software application **128** can communicate a command that prints a report onto label media. The report can include multiple tables and fields that collectively define a printing of a label onto a product to be placed on sale. Some of these fields store values that are fixed while other fields store values that are accessed from other sources, or that are computed during the construction of the report. Some of these non-fixed and computed values are based upon limitations (design characteristics) that are specific to each of the devices **140***x*-**140***z*. The report may also include bar codes and other graphics and can define an arrangement of fields having unusual patterns.

Placement (printing) of portions of the report, such as of a location of numerical fields and barcodes, may be subject to alignment and placement at locations onto printable output media that are based and determined upon one or more physical limitations (design characteristics) of the specialty printing device **140***z*. Rather than the software application **128** determining and specifying at what specific location a field should be placed (printed), via factoring characteristics and limitations of the device **140***x*-**140***z*, the specialty printing module **130** will perform such a determination based upon general rules selected by the software application **128** and limitations (design characteristics) of the particular device **140***x*-**140***z*.

These general rules are embedded into a report specification module (See FIG. **4**), which can be executed by the software application **128**. The software application **128** also invokes a report builder module to generate commands that are targeted and directed to a specific device **140***x*-**140***z*. The specialty printing module **130** delivers the device targeted commands to the device **140***x*-**140***z* via the operating system **122** and at least one of its device drivers **126**.

In some circumstances, the specialty printing device **140***z* has a universal serial bus (USB) wireline connection to the computer system **120**. In this circumstance, the operating system **122** and at least a USB device driver would be employed to communicate (deliver) the device targeted commands from the specialty printing module **130** to the specialty printing device **140***z*. In other circumstances, the specialty printing device **140***z* has a wireless WiFi communication connection to the computer system **120**. Likewise, in this circumstance, the operating system **122** and at least a WiFi device driver would be employed to communicate (deliver) the device targeted commands from the specialty printing module **130** to the specialty printing device **140***z*.

Furthermore, as shown in FIG. **3**, another software application **118** executing on another computer system **110** may communicate with the specialty printing module **130** that is executing on this computer system **120**, in order to access and control a specialty printing device that is not directly accessible from the another computer system **110** and upon which the software application **118** resides. At least one of various types of communications channels can be employed between the software application **118** and the specialty printing module **130** to enable communication to each other through a network **150**. Such a communications channel, such as a socket to socket or OpenURL( ) accessed communication channel, for example, is typically accessible their respective operating systems (OS) **112**, **122** via their respective applications programming interfaces (API) **114**, **124**.

FIG. **2** illustrates a simplified representation of hardware and software residing within the host computer system **120**, also referred to herein as a computing platform **120**. As shown, the computer system **120** includes at least one system bus **160** which is electronically connected to a central processing unit (CPU) and random access memory (RAM), which is employed to provide a virtual address space (virtual memory) **120***a* for storage of software executing on the computer system **120**. Device interface hardware **164** is also electronically connected to the system bus **160** and is employed for performing transfer (input and output) of data between components **120***a*, **162** that are internal to the computer system **120** and devices **140***z*, **166**-**168** that are connected to it **120**. A mass storage device, such as a hard disk **166** or other non-volatile data storage device, and user interface hardware, such as collectively a liquid crystal display (LCD) screen with mouse and a keyboard **168**, are at least among the devices that are connected to the computer system **120**. Also note that network interface hardware is employed for electronic connection to a communications network **150** and is not explicitly shown here.

FIG. **3** illustrates communication between a plurality of host computer systems **110**, **120** and a variety of specialty printer devices **140***a*-**140***c*. As shown, a host computer **110** includes hardware and various software components like that shown for computer system **120** in FIG. **2**. The host computer system **110**, also referred to herein as a computer system or a computer **110**, has software including an operating system **112**.

The operating system **112** includes an applications programming interface (API) **114**, one or more device drivers **116***a*-**116***b*, also referred to herein collectively as the device drivers **116** of computer **110**. These device drivers **116**

include such as one or more network device driver(s) **116***c*, and one or more specialty printer device drivers **126***a*-**126***b*. These specialty printers **140***a*-**140***c* are also referred to herein as specialty devices **140***a*-**140***c*, because some specialty printers function more as an specialty type of device than an actual printing device.

The operating system **112** includes an API **114** that is a programming interface between the operating system **12** and each of one or more software application programs **118** executing on the computer system **110**. The network device driver **116***c* interfaces with electronic hardware (electronics) that provides access to a particular type of communications network **150**. This hardware may interface with a network having a wired topology, referred to herein as a wired or wireline type of network, such as an Ethernet network, or this hardware may interface with a network having a wireless topology, referred to herein as a wireless type of network, such as the wireless IEEE 802.11 network.

Device drivers may be assigned to multiple categories that overlap. For example, a device driver that interfaces with an Ethernet network would fall into both a network communications device driver and a wireline connected device driver category, and a device driver that interfaces with an IEEE 802.11 network, would fall within both a network communications device driver and wireless communications device driver category.

As shown in FIG. **3**, the computer **110** has a wireline connection to a type of specialty printing device **140***a*, which is also generally referred to herein as a specialty output device, or as a specialty printer **140***a*. A specialty printer, is a type of output device that performs functions that are outside the capabilities of conventional type of paper document printer. A specialty printer can be designed to transfer information in the form of ink deposited onto media, or transfer information that is in a form other than ink, such as an electrical encoding of a numerical value into or onto appropriate media designed to store such a value.

Although a specialty output device (printer) has capabilities outside that of a conventional document printer, in some embodiments, a specialty printer can print a document onto media, such as in the form of ink onto paper media, or as in the form of ink onto non-paper media, or as in the form of depositing other than ink onto non-paper media. However, because some embodiments of a specialty printer can effectively print a document in some manner, such embodiments of a specialty printer may not be able to print a document as wells as, for example as quickly or as accurately, as some conventional document printers.

As an ink depositing type of printer, a specialty printer can be designed to deposit ink onto a special type of media, such as label media, or to deposit ink onto more common types of media, such as onto one or more sheets of paper for the purpose of printing documents. Label media, can be manufactured into many forms, and is typically manufactured and packaged into a roll of media, and is cut into individual sheets as needed. As cut, these sheets have an adhesive rear side and a printable forward side. The forward side is designed to store information in the form of ink deposits arranged to represent text fonts and graphics and images. These deposits can also include various types of printed bar code information. The text fonts can be arranged in various patterns, including horizontal lines, or other than horizontal lines, and can be patterned and directed along a horizontal direction, along a vertical direction and/or along a diagonal direction, for example.

Alternatively, a specialty printer can for example, store a numerical code inside of media that functions as an radio frequency identification (RFID) transponder. Such media is typically non-paper based media, such as that made from a polymer. The media may be packaged in a form that requires cutting or may be pre-separated and optionally stacked, prior to or after processing (printing) of the media. In this circumstance, a processed unit of media could function as an RFID transponder.

The media, whether or not it is made from a particular type of material, such as some type of paper or polymer, may require some form of delimitation and separation via a cutting or tearing action, to delimit and separate each unit of media. For example, with respect to label media, a unit of media could constitute one processed (printed) label. With respect to RFID media, a unit of media would be a processed (numerical code stored) RFID transponder.

As shown in FIG. **3**, the computer **110** communicates with another computer **120** via a communications network **150**. The computer **120** may be located within the same room, or the same building, may be located many miles from computer **110**. As shown, the computer **110** has a direct connection to (1) output device, referred to herein as specialty printer **140***a*. The computer **120** has a direct connection to (2) associated output devices, also referred to herein as specialty printers **140***b*-**140***c*. Note that each of the specialty printers **140***a*-**140***c*, are not the same type of printer and are instead each designed to function as a different type of output device (specialty printer).

The computer **120** has a specialty printing (software) module **140** that interfaces with an operating system **122**, via an API **124** of the operating system **122**. The specialty printing module **130** also interfaces with a software application **128** residing and executing on the same local computer **120**. The specialty printing module **130** also provides an application programming interface (API) **132** for one or more executing software applications **118**, that reside on the remotely located computer **110**.

This API **132** of the specialty printing module **130** is designed to provide a programming interface for local (**128**) and remotely located (**118**) software applications **118**, **128** to interface with a particular specialty printer **140***a*-**140***c*. A first portion of the API **132** is characterized as processing device specific (low level) commands, meaning that the specialty printing module **130** passes through commands received from the software application **118**, **128** to the specialty printer **140***a*-**140***c*. A second portion of the API **128** is characterized as processing other (high level) commands, meaning that the specialty printing module responds to directly, or translates a high level command into a set of one or more lower level commands for delivery to the particular specialty printer **140***a*-**140***c*.

The design of the API **132** is an alternate and unique API as compared to what is typically provided by a device driver **116**, **126**. Furthermore, this API **132** is designed to be accessible from both local software applications **128** that are executing on the same computer **120**, and designed to be accessible from remote software applications **118** via a network **150**, that are executing on other remote computer systems, such as computer **110**, for example.

Via the specialty printing module **130** and network **150**, the software application **118** executing on computer **110**, can access either or both of the remotely located specialty printers **140***b*-**140***c*. Furthermore, this remotely located software application **118** can access these printers via a uniformly designed API **132** that is provided by the specialty printing module **140**. Likewise, the software application **128** that resides local to computer **120**, can also access and interface with these specialty printers **140***b*-**140***c*, which are directly

accessed by computer **120**, via the same uniformly designed API **132** provided by the specialty printing module **130**.

Without the specialty printing module **130**, the software application **118** would have no access to the specialty printers **140***b*-**140***c*, given that there is no other mechanism available to the software application **118** providing such access. Without the specialty printing module **130**, the software application **128** would be required to interface with the specialty printer **140***b* via a device driver **126***b* of a first particular design and required to interface with specialty printer **140***c* via device driver **126***c* of a second particular design. Because specialty printers **140***b* and **140***c* each have a different function and design relative to each other, the device drivers **126***b* and **126***c* would likewise be expected to each have a different design relative to each other, and furthermore, each of the device drivers **126***b* and **126***c* would each likely provide a API that is separately and differently designed relative to each other.

With separate and differently designed device drivers **126***b*-**126***c*, the software application **128** would be required to include additional software to separately interface with each of both of the device drivers **126***b*-**126***c*. Furthermore, at least one or both of these device drivers **126***b*-**126***c* will likely provide a more limited programming interface, and likely provide a programming interface that is a subset of that provided by the specialty printing module (SPM), to each specialty printer **140***b*-**140***c*.

Importantly, the specialty printing module **130** provides to the software application **118** of computer **110**, an indirect connection to the (2) specialty printers **140***b*-**140***c* of computer **120**, via the API **132** of the specialty printing module **130**. The specialty printing module **130** also provides its API **132** to a software application **128** that is executing local to it **130** on the computer **120**.

FIG. **4** illustrates a simplified representation of the internals of an embodiment of the software application of FIG. **3**. As shown, the software application **128**, includes control logic **410** that is designed to control operation of the software application **128**. Via execution of the control logic **410**, the software application **128** inputs device data **402**, local data **404** and/or remote data **406**.

Device data **402** is encoded information that describes characteristics and limitations of a specialty printing device **140***a*-**140***c* whose operation is to be controlled via commands within a report that are to be generated by the software application **128**. Data, including device data **404**, can also be accessed from a local source **404** and/or from a remote source **406**. Such data can include for example, static information such as a number of columns for printing, or include dynamic information such as date and time information.

The software application control logic **410** executes a report specification module **412** for defining a structure of a report. The structure of the report is defined in terms of one or more tables, fields, barcodes etc. The report can define a sales receipt, optionally with total and subtotal values. The report specification module **412** generates a report object **420** which functions as a template for a report to be generated. The software application control logic **410** further initiates execution of a report builder module **414** that functions to complete construction of the report object **420**. Within the report object **420**, commands are generated to control operation of the specialty printing module (SPM) **130** and to control operation of a targeted specialty device **140***a*-**140***c*. Collectively, these commands are referred to herein as specialty printing module (SPM) commands **430**. These SPM commands are communicated from the software application **128** to the specialty printing module **130**.

FIG. **5** illustrates a simplified representation of communication between the software application **128** and the specialty printing device **140***z* via a communications device driver **126***x*. As shown, the software application **128** communicates SPM commands **430** to the specialty printing module **130** as described in association with FIG. **4**. The specialty printing module **130** interfaces with the API **124** of the operating system **122** to communicate the device specific commands **530** to the specialty printing device **140***z*. In a pass through mode, device specific commands embedded into the SPM commands **430** are passed through the SPM **130** and relayed to the specialty device **140***z*.

Notice that the SPM **130** communicates the device commands **530**, not through a specialty printer device driver **126**, but instead communicates the device commands **530** via a communications device driver **126***x* to the specialty printing device **140***z*. A communications device driver **126***x* is designed for a specific type of communication and is not specifically designed for control of the specialty printing device.

For example, in some circumstances, the specialty device driver **126***x* is connected via a universal serial bus (USB) wireline type of connection. In this circumstance, the communications device driver **126***x* is a universal serial bus (USB) device driver. This USB device driver **126***x*, is a device driver that is not required to be designed in accordance with a specific set of design characteristics of the specialty printing device **140***z*. In other words, no device driver that is specifically designed for the specialty printing device **140***z* is required to communicate with and control the specialty printing device **140***z*.

Likewise, in another circumstance, communication with an Ethernet connected specialty printing device **140***z* would simply require an Ethernet driver **126***z*. And likewise, in another circumstance, a WiFi connected specialty printing device **140***z* would simply require an WiFi driver. This type of arrangement unburdens the operating system **122** and its drivers **126** from being required to have device specific device drivers installed for all of its device drivers. Furthermore, it unburdens the operating system **122** from obtaining version updates for such specialty device drivers.

FIG. **6** illustrates a simplified representation of communication between the software application **128**, an HTML browser **610** and the specialty printing module **130**. As shown, the software application **128** can store SPM commands **430** into a set of hypertext markup language (HTML) **630**. The HTML **630** is input and processed by a (Internet Web) browser program **610**.

The HTML **630** can direct the browser program **610** to display a list of actions to be executed at the option of a user that is interfacing with the browser program **610**. Each action can be represented as text that is read by the user. Upon activation (selection) of the text by the user via a pointing device or keyboard input, for example, the browser program **610** communicates the SPM commands **430** to the specialty printing module (SPM) **130**. And as described in association with FIG. **4**, the SPM **130** module communicates any device specific commands **530** to the specialty printing device **140***z* via the operating system **122** and at least one of its device driver(s) **126***x*.

The SPM **130** receives and processes commands that are transmitted directly or indirectly from a software application **128**. In some embodiments, the programming interface that resides in between the SPM **130** and the software application **128**, is configured to enable transfer of one or more uniform resource locator (URL) addresses from the software application **128** to the SPM **130**. These URL addresses can include a

success URL address and a failure URL address. A success URL address is a URL address of a software component, typically the URL address of the software application **128** itself. A failure URL address may be the URL address of the software application **128** itself, or alternatively, a URL address of a software component other than the software application **128**.

Upon successful completion of command processing, the SPM **130** will interact with the operating system to cause transition to execution of a software component addressed by the success URL address. Alternatively, if the command processing is unsuccessful, the SPM **130** will cause the operating system to transition to execution of a software component addressed by the failure URL address.

Optionally, the programming further enables return to the software application **128** of any data returned by the specialty printer **140***x* in response to its communication with the specialty printing module **130**, while processing printing commands.

In some embodiments, the browser program is configured to list a specialty printer discovery action, that when selected, will search for and discover uniform resource locator (URL) addresses for each available specialty printer that resides within a particular network computing environment. Upon selecting a URL for a specialty printer, that printer can be communicated with from the software application **128** via the SPM **130**.

FIG. **7** illustrates a report that is rendered (printed) onto media of a specialty printer. A report is defined to include one or more tables, while each table is defined to include one or more fields. As shown, an embodiment of a report **710** includes (3) tables **736***a*-**736***c*. These tables **736***a*-**736***c* can be rendered (printed) as a report that constitutes one label that is printed onto an adhesive-backed media, or rendered onto an electronic user interface display, or rendered (printed) onto a portion of a roll of journal receipt paper, for example.

Each table **736***a*-**736***c* is positioned either at an absolute location within boundaries of the report **710**, or positioned at a location that is relative to a location of another table that is included within the same report **710**. Each table **736***a*-**736***c* includes one or more fields. As shown, the table **736***c* includes fields **737***a*-**737***c* which each appear to function as a title or label of a column of text within the report **710**.

Each field **737***a*-**737***c* is positioned either at an absolute location within boundaries of the table **736***c*, or is positioned at a location that is relative to that of a location of another field that is included within the same table **736***c*. Each field represents a portion of data of a report that is rendered (printed), for example, as text, a barcode, an image or the like.

Data of a report is divided into one or more data items. For example, a data item can be alphanumeric text that identifies a food item for sale, or alternatively could be alphanumeric text to quantify a price of a purchased food item. Each field, such as fields **748***a*-**748***e* can include one or more data items. For example, field **748***c* can include (3) data items that are rendered and delimited by at least one comma text character. As a result, a definition of a report can vary substantially in relation to other reports, depending upon the number and types of defined tables, and upon the number and types defined fields within each defined table, and as a result, can specify a wide variety of arrangements of rendered (printed) information.

This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they have structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal language of the claims.

What is claimed is:

1. An apparatus for enabling operation of a specialty printer to be controlled from a software application; said apparatus including:

a specialty printing module that is configured for communicating with a software application and configured for communicating with a specialty printer, via at least one communication channel; said software application executing on a first platform and said specialty printing module executing on a second computing platform; and wherein

said specialty printer is a device having functionality for transferring information onto media and wherein control of at least some of said functionality is not directly accessible to said software application via said operating system or its associated device drivers at a first time; and wherein

said specialty printing module provides control to said software application of at least a portion of said at least some of said functionality, that is not otherwise provided to said software application via said at least one of an operating system and its associated device drivers.

2. The apparatus of claim **1** including a printer discovery function that enables said software application to determine an availability of access to an executing specialty printing module.

3. The apparatus of claim **1** including a means for said software application to determine an availability of access to one or more specialty printers via access to said specialty printing module.

4. The apparatus of claim **1** wherein said specialty printing module is accessible via a uniform resource locator (URL) address.

5. The apparatus of claim **1** wherein said specialty printing module provides an application programming interface to said software application that is configured for control of at least one type of specialty printer.

6. The apparatus of claim **5** wherein said application programming interface includes a pass through mode of operation wherein directives transmitted from said software application are re-transmitted by said specialty printing module without modification to a specialty printer.

7. The apparatus of claim **5** wherein said application programming interface is configured to enable said software application to direct a specialty printer to print a label onto printing media.

8. The apparatus of claim **5** wherein said application programming interface is configured to enable said label to be defined as a combination of one or more tables.

9. The apparatus of claim **5** wherein said printing media is a roll of paper and wherein said application programming interface is configured to enable said software application to direct said specialty printer to cut said printing media at a location relative to said label as printed onto said printing media.

10. The apparatus of claim **5** wherein said application programming interface is configured to enable said software application to print a sales receipt onto a specialty printer.

11. The apparatus of claim 1 wherein said specialty printing module directs printing of a report in accordance with a specification and data associated with said report.

12. The apparatus of claim 1 wherein said specialty printing module directs printing of a label in accordance with a specification and data associated with said label.

13. The apparatus of claim 1 wherein said specialty printing module directs printing of a document.

14. The apparatus of claim 5 wherein said media contains an RFID transponder.

15. The apparatus of claim 5 wherein said specialty printing module directs encoding of said RFID transponder in said media containing said RFID transponder.

16. The apparatus of claim 5 wherein said programming interface is accessible through a uniform resource locator (URL) address.

17. The apparatus of claim 5 wherein said programming interface further includes at least one return URL of a software component interfacing with said specialty printing module, said software application being executed upon completion of said printing via actions of said specialty printing module.

18. The apparatus of claim 17 wherein said programming interface enables return to said software application any data returned from said specialty printer in response to any communication between said specialty printer and said specialty printing module.

19. The apparatus of claim 1 wherein said first computing platform and said second computing platform are the same.

20. A system for enabling operation of a specialty printer to be controlled from a software application; said apparatus including:

a specialty printing module that is configured for communicating with a software application and configured for communicating with a specialty printer, via at least one communication channel; said software application executing on a first platform and said specialty printing module executing on a second computing platform; and wherein

said specialty printer module providing an applications programming interface for controlling said specialty printer that is configured for transferring information onto media and wherein control of said specialty printer is not accessible to said software application via said operating system or its associated device drivers; and wherein

said specialty printing module providing control to said software application of said specialty printer, said control is not otherwise provided to said software application via said operating system and its associated device drivers.

21. The system of claim 20 wherein said first computing platform and said second computing platform are the same.

22. A method for enabling operation of a specialty printer to be controlled from a software application; said method including the steps of:

providing a specialty printing module that is configured for communicating with a software application and configured for communicating with a specialty printer, via at least one communication channel; said software application executing on a first platform and said specialty printing module executing on a second computing platform; and wherein

said specialty printer module providing an applications programming interface for controlling said specialty printer that is configured for transferring information onto media and wherein control of said specialty printer is not accessible to said software application via said operating system or its associated device drivers; and wherein

said specialty printing module providing control to said software application of said specialty printer, said control is not otherwise provided to said software application via said operating system and its associated device drivers.

23. The method of claim 22 wherein said first computing platform and said second computing platform are the same.

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